

### **REMARKS**

Claims 2-15 and 17-20 are pending in this application. By this Amendment, the specification and claims 3, 4, 14 and 19 are amended. Support for amended claims 3, 14 and 19 may be found in originally filed claim 4, and page 4, lines 23-26 in the instant specification. No new matter is added. Reconsideration and allowance of this application are respectfully requested.

### **ENTRY OF AMENDMENT AFTER FINAL REJECTION**

Entry of the Amendment is requested under 37 C.F.R. § 1.116 because the Amendment: a) place the application in condition for allowance for the reasons discussed herein; b) do not raise any new issues requiring further search/consideration; c) do not present any additional claims without cancelling the corresponding number of final rejected claims; and d) place the application in better form for appeal, if an appeal is necessary. Entry of the Amendment is thus respectfully requested.

### **OBJECTION TO THE DRAWINGS**

The Examiner has objected to the drawings under 37 C.F.R. § 1.83(a) as the drawings must show every feature of the invention specified in the claims. Specifically, the Examiner stated that the feature of “the heat slug comprises a solder bonding layer formed on the surface of a heat slug that contacts the solder film” (claim 8) must be shown for the features canceled from the claims.

Applicants respectfully submit that reference character “41” in Fig. 1 discloses the features recited in claim 8. Namely, reference character 41 is an “adhesion layer” that may be formed on one side of the heat slug 40. Applicants have amended the specification to reflect the above assertion.

Accordingly, reconsideration and withdrawal of the objection are respectfully requested.

### **EXAMPLE EMBODIMENT**

As shown in an example, non-limiting embodiment, Fig. 1 illustrates a semiconductor chip package 100 having a substrate 20 with a plurality of bonding pads 22; a semiconductor chip 10 having a plurality of conductive bumps 16 on a front side thereof, the conductive bumps may contact the bonding pads; a heat slug 40 that may be bonded to a back side of the semiconductor chip 10; and a solder film 30 may be directly attached to the heat slug thereby bonding the heat slug to the back side of the semiconductor chip. The back side of the semiconductor chip may include a solder bonding multi-metal layer film 14 in contact with and between the semiconductor chip 10 and the solder film 30. The solder bonding multi-metal layer film 14 may be employed to strengthen the adhesion between the semiconductor chip 10 and the solder film 30.

### **CLAIM REJECTIONS - 35 U.S.C. § 102**

Claims 3, 5, 6, 14 and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ozawa et al. ("Ozawa"), US Patent 5,592,735. This rejection is respectfully traversed.

Applicants submit that Ozawa fails to disclose or suggest, *inter alia*, "the backside of the semiconductor chip includes a solder bonding multi-metal layer film in contact with and between the semiconductor chip and the solder film", as recited in claim 3.

The Examiner allegedly asserted that conductive block 33-2 of Ozawa corresponds to a "solder bonding metal layer". However, Applicants submit that block 33-2 is merely a thermally conductive block, and not a "solder bonding metal layer".

Even assuming that the conductive block 33-2 may be a solder bonding metal layer (in which Applicants do not agree or admit to), it is respectfully submitted that the conductive block 33-2 is not a multi-metal layer film. Ozawa discloses that the thermally conductive blocks are formed of a metal block of aluminum.<sup>1</sup>

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<sup>1</sup> See Ozawa, col. 5, lines 1-4.

Accordingly, Ozawa fails to disclose or suggest the “back side of the semiconductor chip includes a solder bonding multi-metal layer film in contact with and between the semiconductor chip and the solder film”, as recited in claim 3.

With regard to independent claim 14, Applicants submit that claim 14 is allowable for the similar reasons discussed above with regard to claim 3.

Because Ozawa fails to disclose each and every feature of the claimed invention, it cannot provide a basis for a rejection under 35 U.S.C. § 102.

For at least these reasons, claims 3 and 14 are patentable. Claims 5, 6 and 15, which depend from the independent claims are also patentable by virtue of their dependency, and for the features recited therein. Withdrawal of the rejection is respectfully requested.

#### **CLAIM REJECTIONS - 35 U.S.C. § 103**

Claims 2 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ozawa in view of Haley, US Patent 5,359,768. This rejection is respectfully traversed.

As discussed above, Ozawa fails to disclose or suggest the claimed invention as found in claim 3, the independent claim from which the rejected claims depend. Further, Haley fails to overcome the noted deficiencies of Ozawa. Withdrawal of the rejection is respectfully requested.

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ozawa in view of Furukawa et al. (“Furukawa”), US Patent 5,683,937. This rejection is respectfully traversed.

As discussed above, Ozawa fails to disclose or suggest the claimed invention as found in claim 3, the independent claim from which the rejected claim depends. Further, Furukawa fails to overcome the noted deficiencies of Ozawa for at the following reasons.

Furukawa merely discloses a multi-metal electrode 220 formed on a semiconductor substrate 201 (see Fig. 9A and 9B), but does not teach or suggest a “solder bonding metal layer” which is a multi-metal layer film. Accordingly, one skilled in

the art would appreciate that an electrode is not equivalent (or provides a similar characteristics) to a solder bonding metal layer. Thus, the Examiner has not adequately supported the selection and combination of Ozawa and Furukawa to render claim 3 as obvious. Withdrawal of the rejection is respectfully requested.

Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ozawa in view of Takahama et al. ("Takahama"), US Patent 5,336,364. This rejection is respectfully traversed.

As discussed above, Ozawa fails to disclose or suggest the claimed invention as found in claim 3, the independent claim from which the rejected claim depends. Further, Takahama fails to overcome the noted deficiencies of Ozawa. Withdrawal of the rejection is respectfully requested.

Claims 8 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ozawa in view Myers et al. ("Myers"), US Patent 5,395,679. This rejection is respectfully traversed.

As discussed above, Ozawa fails to disclose or suggest the claimed invention as found in claim 3, the independent claim from which the rejected claims depend. Further, Myers fails to overcome the noted deficiencies of Ozawa. Withdrawal of the rejection is respectfully requested.

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ozawa in view Jeong et al. ("Jeong"), US Patent 6,060,778. This rejection is respectfully traversed.

As discussed above, Ozawa fails to disclose or suggest the claimed invention as found in claim 3, the independent claim from which the rejected claim depends. Further, Jeong fails to overcome the noted deficiencies of Ozawa. Withdrawal of the rejection is respectfully requested.

Claims 11 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ozawa in view of Hawthorne et al. ("Hawthorne"), US Patent 5,410,451. This rejection is respectfully traversed.

As discussed above, Ozawa fails to disclose or suggest the claimed invention as found in claim 3, the independent claim from which the rejected claims depend.

Further, Hawthorne fails to overcome the noted deficiencies of Ozawa. Withdrawal of the rejection is respectfully requested.

Claims 17 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hawthorne in view of Ozawa. This rejection is respectfully traversed.

Applicants submit that Hawthorne and Ozawa, individually or in combination, fail to disclose or suggest, “the backside of the semiconductor chip includes a solder bonding multi-metal layer film in contact with and between the semiconductor chip and the solder film”, as recited in claim 19.

The Examiner admitted that Hawthorne fails to disclose “a solder bonding metal layer”.<sup>2</sup> Yet, the Examiner attempts to overcome the admitted deficiency of Hawthorne by arguing that Ozawa teaches the solder bonding metal layer.

However, Applicants respectfully submit that Ozawa fails to teach or suggest the “solder bonding metal layer” at least for the reasons discussed above with regard to independent claim 3. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Hawthorne in view of Ozawa, and further in view of Takahama. This rejection is respectfully traversed.

As discussed above, Hawthorne and Ozawa fail to disclose or suggest the claimed invention as found in claim 19, the independent claim from which the rejected claim depends. Further, Takahama fails to overcome the noted deficiencies of Hawthorne and Ozawa. Withdrawal of the rejection is respectfully requested.

Claim 20 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Hawthorne in view of Ozawa, and further in view of Jeong. This rejection is respectfully traversed.

As discussed above, Hawthorne and Ozawa fail to disclose or suggest the claimed invention as found in claim 19, the independent claim from which the rejected claim depends. Further, Jeong fails to overcome the noted deficiencies of Hawthorne and Ozawa. Withdrawal of the rejection is respectfully requested.

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<sup>2</sup> See Final Office Action, page 9.

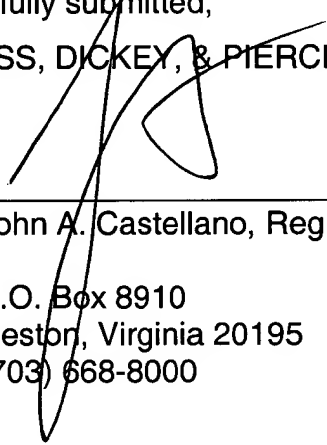
**CONCLUSION**

In view of the above, Applicants earnestly solicit reconsideration and allowance of all of the pending claims.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,  
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